

considerable advantage gained over the Barbarians, and not over the Romans.

XXIV. An Account of some Experiments relating to the Preservation of Seeds: In Two Letters to the Right Honourable the Earl of Macclesfield, President of the Royal Society. From John Ellis, Esq; F. R. S.

My Lord, London, Jan. 18. 1759.

Read Jan. 18,
1759. **A**S the supplying our colonies with
the seeds of useful plants, in order
to have their produce imported from thence into
England, instead of the places of their natural growth
in Europe, Asia, and Africa, as we do at present, is a
matter of some importance, therefore I am persuaded,
that experiments tending to promote so useful and
beneficial a work, will meet with the approbation of
this honourable Society.

Among many useful seeds, which I sent governor Ellis in the year 1757, were some acorns of the cork-tree, which were put in a box in sand. These, he mentions in his last letters, were entirely spoiled in the voyage; and observes, that the confined air in the hold of ships, occasions such hot and penetrating steams, especially in warm climates, that it disposes all seeds, in common packages, to a sweating or putrefactive fermentation, by which the vegetative quality of many is entirely destroyed: and therefore advises,

vises, that seeds should be sent in tight casks, and placed on or near the deck, so as to have the benefit of the fresh circulating air, at the same time the tightness of the cask would secure them from the salt water.

In order to send the governor a fresh supply of cork acorns, in a growing state, I tried the following experiments on them to preserve them sound; the effect of which I expect to have the honour to lay before this Society next summer: but as I tried the very same experiments, at the very same time, on a parcel of fresh oak acorns, which I collected myself at Sydenham in Kent, the latter end of last October, and have since kept them by me in a box in a warm room, it may give us some insight into what may be the fate of those that are sent abroad.

The experiments were made between the 25th and 30th of October 1758; and the acorns cut open to see the effects, Jan. 17, 1759.

Experiment 1. Acorns of the English oak smeared over several times with a strong solution of gum arabic; and also they had been dried in a window, folded in a piece of paper, and put into a deal box.

When these were cut open, they appeared hard, dry, and inclining to black, being quite perished.

When I first thought of making this experiment, I imagined, that the perspirable matter of the kernel of the acorns could not pass through the glassy, close substance of the gum arabic; but experience has convinced me of the contrary.

Exp. 2. Some acorns, treated as in the first experiment, were wrapped up in papers, soaked in a strong solution of gum arabic, each in a separate paper:

after they had been dried, they were put in the box with the rest.

These were somewhat softer than the first, but decayed.

Exp. 3. Some of them were smeared several times over with gum senega ; and when they were dried in the window, and well hardened, were put in a paper into the deal box.

These looked rather better than the two former parcels ; but unfit for vegetation.

Exp. 4. Some of the same acorns were put into the middle of a cake of plasterers stiff loam, or such as the brewers use to stop their beer barrels, and covered over near an inch on every side. This soon became dry, without any cracks : it was about $2\frac{1}{4}$ inches thick ; and was placed with the rest, wrapped up in a paper, in the box.

The kernels of these were shrivelled up, and grown quite dry and hard, like horn, the loam proving a strong absorbent.

Exp. 5. Some were rolled up separately in thin flakes of bees-wax, warmed, to make it pliable, and put in paper in the box.

These looked very well when they were cut asunder, and appeared likely to grow ; but were a little shrunk.

Exp. 6. Some were rolled separately in rosin, made pliable with warmth.

These cut quite fresh.

Exp. 7. Some of them were rolled, each in a thin covering of a mixture of pitch, rosin, and bees-wax, called mummy by the gardiners.

These cut as well, and looked as fresh, as if they had just fallen from the tree.

The

The cork acorns, that were sent to Georgia, were inclosed in the same substances with the foregoing, and put into a box filled with dry sand, quite full, and well fastened : this was put into a tight cask, among papers and wearing apparel, and stowed in the upper part of the hold of the ship.

While I was making these experiments, I wrote to Dr. Linnæus, of Upsal, for his opinion of them, and for his method of preserving seeds in long voyages. I have lately received his answer ; in which he considers the great danger that attends seeds in warm voyages, in the same light with governor Ellis, and has communicated to me a very probable method of preserving seeds in long voyages, which, he says, has never failed. The following is an extract of his letter to me, dated the 8th of Dec. 1758, from Upsal.

“ Seeds may be brought from abroad in a growing state, if we attend to the following method : ”

“ Put your seeds into a cylindrical glass bottle, and fill up the interstices with dry sand, to prevent their lying too close together, and that they may expire freely through the sand ; then cork the bottle, or tie a bladder over the mouth of it. Prepare a glass vessel, so much larger than that which contains the seeds, that, when it is suspended in it, there may be a vacant space on all sides of about two inches distance between both glasses, for the following mixture ; four parts of nitre, and one-fifth part, of equal parts, of common salt, and sal ammoniac : these must be well pounded, and mixed together, and the spaces all round between the outward and inward glasses well filled with it.”

" This saline mass, which should be rather moist,
 " will always be so cold, that the seeds in the inner
 " glass will never suffer, during their voyage, from
 " the heat of the air.

" This experiment has been tried, and has not
 " failed."

I am, my Lord,

Your Lordship's

Most obedient, humble servant,

John Ellis.

My Lord,

Read Dec. 20, 1759. IN a letter, which I took the liberty to
 address to your Lordship, dated Jan.
 18, 1759, relating to some experiments, which I
 had made to preserve the acorns of English oaks for a
 longer time than usual, in a perfect state of vegeta-
 tion, I there took notice, that I had sent some acorns
 of the cork oak to the governor of Georgia, preserved
 in much the same manner: but as the substances I
 made use of for this purpose differed a little, I shall
 describe those experiments here more particularly.

On the 27th of Nov. 1758, I prepared seven par-
 cels of the acorns of the cork-bearing oak or ilex, in
 the following manner:

Nº 1. 15 acorns, each covered over singly with a
 stiff solution of gum arabic, and afterwards
 rolled up in gum'd paper.

Nº 2. 13 Dº. each rolled up in a thin cover of com-
 mon yellow bees-wax, softened before the
 fire, and rolled up afterwards, separately,
 in white paper.

Nº 3.

- N° 3. 10 D°. each rolled up, as before, in *wax*, and afterwards each covered with a coat of *brewers loam moistened* with a thick solution of *gum arabic*.
- N° 4. 5 D°. each coated with *gum arabic*, and afterwards with *whiting moistened* with a thick solution of *gum arabic*.
- N° 5. 25 D°. each coated with *gum arabic*, and afterwards with *brewers loam moistened* with a thick solution of *gum arabic*.
- N° 6. 3 D°. each covered with *gardeners grafting mummy*, consisting of a mixture of *bees-wax, rosin, and pitch*.
- N° 7. 10 D°. each covered with *fullers earth* made into a *paste* with a stiff solution of *gum arabic*.

These seven parcels were all put into chip boxes, filled with *dry house-sand*, and afterwards put into a *tight cask*; and arrived in Georgia in *April* following. Governor *Ellis*, in his *letter* to me, dated from thence *May 6, 1759.* says, of all these experiments, *none succeeded but the parcel N° 3.* which had first been covered with *bees-wax*, and afterwards with a *paste* made of *loam and dissolved gum arabic*. We even find, that those that were covered with a thin coat of *bees-wax*, and afterwards with *paper*, did not succeed; as their covering was not thick enough to *keep in their perspiration*. This was the case with some of the *English oak acorns*, which I had coated in the *same manner* in *October 1758*, and cut *open* in *November last 1759*; their kernels being *shrivell'd and decayed*: and those I had covered the same time with a mixture of *rosin, bees-wax, and pitch*, tho' their

kernels were *plump* and *juicy*, yet they, by this time, were *turned brown and rancid*, by imbibing the *steams* arising from the pitch and rosin, and were rendered *unfit for vegetation*.

It may possibly be remarked, that it is no uncommon thing to receive the *acorns* of oaks *from* most of the provinces of *North America* in a growing state in *January*, and even in *February*; and therefore it may be asked, *why* it should require *more care* to send acorns of our growth *thither*?

The reason of this appears to me, that as the summer heats of those provinces by much exceed ours; so consequently *their juices being higher matured*, are not so liable to shrivel and decay as *ours* are; which, experience shews, are more *watery, and less oily*: tho', perhaps, if both kinds were packed up in a *dry, soapy earth*, and could be carried at a *cool season* of the year, I mean the winter months, they *might equally succeed*; but, in this kind of weather, we have *seldom an opportunity* to send them, so as to expect their arrival before the weather, in the southern parts of *North America*, begins to grow too warm, as the ships seldom arrive there till April.

The *chesnut*, next to the *acorn*, being the most difficult to preserve found during the course of one season, or a whole year, on the *23d of February* last, 1759, I procured a parcel of *Spanish chesnuts*, just as they were imported, many of which were founder than they generally are so late in the season: these I divided into *four parcels*, and put *each* parcel into a small *earthen jar*, involving them in the following substances:

Jar N° 1. 12 Chesnuts in mutton suet.

2. 12 D°. — in bees-wax and mutton suet,
equal quantities.

3. 12 D°. — in bees-wax.

4. 12 D°. — in bees-wax and yellow rosin,
equal quantities.

These substances I *melted*; but did not pour them among the chesnuts, till I could *bear my finger* in them without the least sensible uneasiness, which I considered as the proper test not to affect the kernels by their heat, and immediately *immersed the jar* to the brim in *cold water*,

As this experiment was made with a *view* to give those gentlemen some hints, who go to the *East Indies*, I placed these jars in a room, where they were *exposed* to the *unusual heats* of last summer; heat being the great promoter of the putrefactive fermentation of vegetables, and which it is very hard for such gentlemen to guard against, especially as they are obliged *twice* in their voyage home to *pass the equinoctial line*.

In order to examine the effects of these experiments, and to lay before the Society a fair account of them, I *broke* all the *jars* on the *22d of November last*, before some ingenious gentlemen of the Society, very intelligent in these matters, and found, that jar N° 1. which contained the chesnuts *immersed* in *mutton suet*, proved *all rotten*, attended with a very disagreeable *putrid smell*. Those in jar N° 2. were *most of them sound and fresh*, and their kernels as white and sweet-tasted, as when *fresh gathered*. These were inclosed in half bees-wax, and half *mutton suet*, melted together. Those in jar N° 3. were *equally*

equally sound and well-tasted, and had been inclosed in bees-wax only.

Though *part* of the chesnuts in these jars were *rotten*; yet it appeared plainly to be *owing to some defect* in them when they were *first* immerfed into these substances; most probably to the lateness of the season, when the experiments were made.

Those in jar N° 4. which were inclosed in half bees-wax and half yellow rosin, were *all turned soft and spongy*, of a *brown colour*, and a *most disagreeable taste and smell*, from the resinous steams they had imbibed.

On the 24th of November last, I planted *six* of the chesnuts preserved in wax and suet (N° 2.) and *six* of those preserved in wax only (N° 3.) in two *garden pots*, and placed them in a very spacious *conservatory*, belonging to my worthy friend Philip Carteret Webb, Esq; F. R. S. at his seat near Godalmin in Surry; where I have the pleasure to inform your Lordship and this honourable Society, that *many of them are already germinating*; which proves this *method* of preserving the larger seeds a *very proper one* to recommend to gentlemen that go to *China*, and other parts of the *East Indies*, to preserve many kinds of valuable seeds in a state of vegetation during a voyage of a *whole year*, till they arrive here; and probably till they are carried to our settlements in the American colonies.

It remains then, for gentlemen who go to the *East Indies*, to place the seeds they preserve in *bees-wax, or bees-wax and suet*, in the *coolest part* of the *ship*, to prevent these substances being affected with the heat of those parts, which far exceeds ours. *Perhaps Dr. Linnæus's method of inclosing them in a larger vessel,*

vessel, and surrounding them with a *mixture of salts*, described in my former letter, will *answer this end*. He speaks with so much certainty of its success, that I think it worth the trial, especially when he *assures us it never fails*.

I am, my Lord,

Your Lordship's

most obedient humble servant,

London, Dec. 13. 1759.

John Ellis.

P. S. Small seeds, in their pods, may be preserved by being placed thinly on pieces of paper, cotton or linen cloth, that have been dipt in wax, then rolled up tight, and well secured from air by a further covering of wax.

XXV. The Case of a very long Suppression of Urine. By Ambrose Dawson, M. D. Communicated by William Heberden, M. D. F. R. S.

Read Nov. 8, 1759. **R.** W. aged 23 years, tall and well-made, was seized, in the year 1755, with a weakness of one side, which soon went off, leaving only one knee weak and swelled; for which she was admitted into St. George's Hospital.

On the 4th of April, 1756, she had a stoppage of urine, and felt no disposition to make any for two days. During the whole month of April, the discharge of urine was very irregular, it having ceased at one time for five days, and at another time for nine days. When the catheter was introduced, little or no urine was found in the bladder.